AAAS SWARM CONFERENCE

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THE STEMS PROGRAM AT UNM AND THE CHALLENGE OF PREPARING TODAY'S SCIENCE TEACHERS

Presenters

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PRESENTATION AGENDA

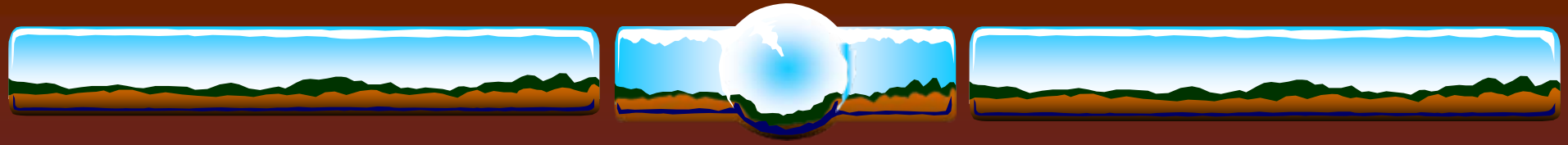
- The historical context
- Current challenges for science teachers
- The STEMS program at UNM
- STEMS interns' perspectives
- Q & A

The Historical Context

- Age of Enlightenment
  - 17th and 18th centuries
  - Europe and America
- Reason becomes the primary basis of authority and truth-seeking
- New models of societies and governments
- The practice of science

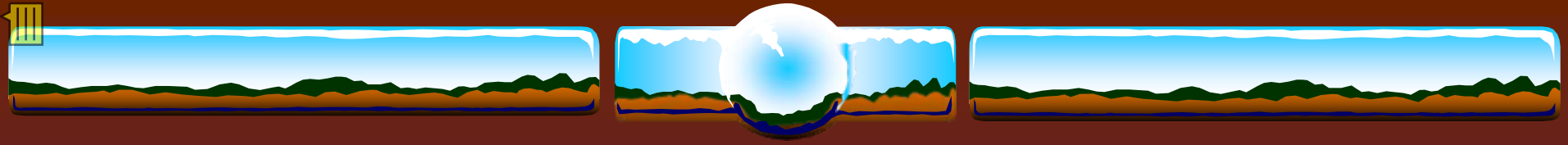
The Development of Science

- Development of the scientific method
- Science helped dispel irrational superstitions and traditions
- Physics, chemistry, biology, and medicine
- Germ theory



So we find ourselves today in the Age of Enlightenment.

Right?



The number of Americans who …

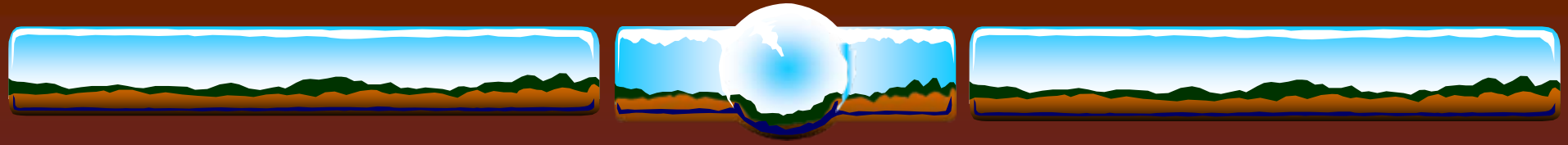
- Believe flying saucers have visited Earth 30-40%
- Accept evolution and natural selection 30-40%

- Understand radiation 1 in 10
- Can explain what DNA does 1 in 3
- Know that the Earth orbits the sun 1 in 5

- Private Universe

Yet more disturbing data

- International comparisons
  - TIMSS – Trends in International Mathematics and Science Study
  - PISA - Programme for International Student Assessment
- Dropout rate
- The percentage of students who say they enjoy science goes down dramatically as they progress from elementary to middle school to high school.



Current Conditions

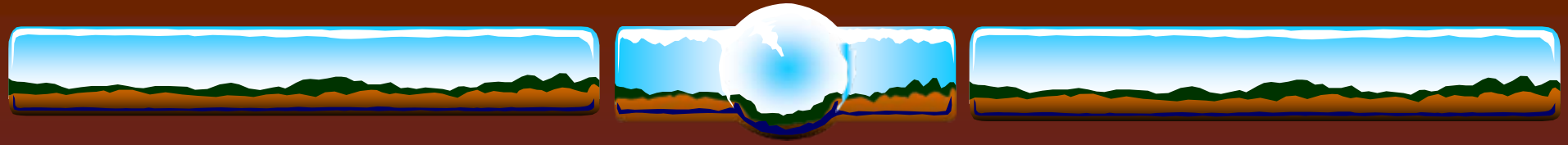
- American students are studying science. Most states now require at least two science courses in high school. More students than ever are taking physics (31%). State science standards cover a wide range of topics, and include life science, physical science, earth and space science, scientific thinking and practice, and science and society.

So why aren't American students learning science?

- The nerd factor
- Competition from the entertainment mentality
  - Cell phones
  - iPods
  - Electronic and video games
- The correct answer compromise

Science Teachers' Role

Every day science teachers transmit the scientific facts and methods of the Age of Enlightenment to young people. They are responsible for passing the torch of reason and positivism.



How can teacher preparation help improve classroom instruction in science?

- Relevance and coherence
- Scientific inquiry
- Learning theory
- High expectations
- Effective use of time
- Technology

Quick Overview of the STEMS Program

- The University of New Mexico/Secondary Teacher Education in Math and Science Program **(STEMS)** is an intensive teacher education program which enables post-baccalaureate students to earn a New Mexico secondary (grades 7-12) teaching license.
- STEMS is a Collaborative Partnership program with Albuquerque Public Schools.

Who applies?

- Must have a degree in science (biology, chemistry, physics, geology, astronomy) or mathematics. Computer science and engineering majors can apply.
- STEMS interns include both recent college graduates and individuals making career changes.

Participant Commitment

- A 14-month (four-semester) course of study at UNM concurrent with a year of field experience in a local middle school or high school.

The First Semester (Summer I)

- Interns participate in UNM coursework combined with field experience in local schools. Interns observe, tutor, and then teach short lessons.

Fall and Spring

- Field Experience: Interns are assigned in paired teacher-teams to full-time teaching positions with Albuquerque Public Schools.
- Teacher-team interns accept full responsibility for an APS classroom position and function as full-time members of the school's staff.
- During both the fall and spring semesters while interns are teaching, they complete six credit hours of coursework in curriculum, methodology, and content pedagogy.

Summer II

- Interns complete the remainder of their coursework in the summer session following the school year.
- They then submit applications to the Professional Education Department in Santa Fe to gain a level-one teaching license.

Benefits to Students

- No previous teaching experience is necessary.
- UNM STEMS interns receive tuition waivers for all but the first semester (summer) of coursework
- Interns are paid a stipend for their work in the classroom during the school year.
- Interns are eligible for student loans.

Program Benefits

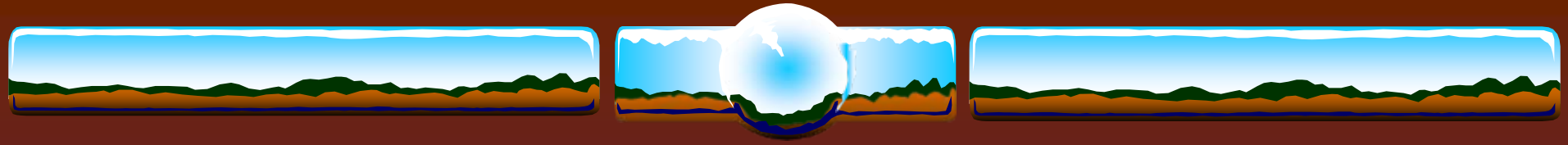
- The **STEMS** Program offers an alternative to traditional teacher preparation models. The focus of the program is on learning to teach in the context of a full-time classroom experience. Interns enter the classroom the first day of the program.
- Interns are able to examine the relationship between theory and practice on a daily basis.
- Interns work in pairs so they develop an immediately accessible support system that allows them to share ideas, to challenge each other, and to actively reflect on their experiences.

Program Benefits

- Throughout the 14-month program, interns receive collegial and professional support from university faculty and from APS teachers who serve as clinical supervisors. The intern cohort serves as a support group. There is sharing of lesson plans, management strategies, struggles, and ideas.
- Additional support is provided by veteran teachers and university faculty.
- Most of the coursework taken for STEMS can be applied to a master's degree in education.

Benefits to the School District

- Recruitment of desperately needed secondary teachers in math and science.
- Immediate application of various teaching strategies in the classrooms. Interns hit the ground running.
- Principals can evaluate interns for possible hiring.



So what does it feel like to go through the STEMS program?